Date: Sat, 4 Sep 93 04:30:13 PDT
From: Ham-Ant Mailing List and Newsgroup <ham-ant@ucsd.edu>
Errors-To: Ham-Ant-Errors@UCSD.Edu
Reply-To: Ham-Ant@UCSD.Edu
Precedence: Bulk
Subject: Ham-Ant Digest V93 #36
To: Ham-Ant

Ham-Ant Digest   Sat, 4 Sep 93   Volume 93 : Issue   36

Today's Topics:

Antennas, Q and bandwidth (2 msgs)
G5RV (2 msgs)
J-pole polarity (2 msgs)
Multiband Hustler on Ford Aerostar?
Questions on antenna resonance... (2 msgs)

Send Replies or notes for publication to: <Ham-Ant@UCSD.Edu>
Send subscription requests to: <Ham-Ant-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Ant Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-ant".

Date: 3 Sep 93 16:17:20 GMT
From: ogicse!hp-cv!hp-pcd!hpcvsnz!tomb@network.ucsd.edu
Subject: Antennas, Q and bandwidth
To: ham-ant@ucsd.edu

John Dormer (aj@sage.cc.purdue.edu) wrote:

:   An antenna which is made of thin wire has a higher Q than one with
: larger elements, extrapolating from the bandwidth figures. I wish I had
: an actual formula for you, though. Anyone?

In another article in this group, wvanhorn@magnus.acs.ohio-state.edu
(William E Van Horne at The Ohio State) posted a reference to a work
that has reasonable answers to this:
=: ... In fact, it is
=: my "bible" of antenna design. It is in two parts. Part one is in HAM
=: RADIO, April, 1977, pp. 52-58. The second in May, 1977, pp. 29-39. The
=: full reference is: Boyer, Joseph M. (W6UYH): "The Antenna-Transmission

=: Line Analog".
=:
=: I believe copies of articles from the now defunct magazine are available
=: from CQ Communications, Inc., 76 North Broadway, Hicksville, NY 11801-2953,
=: USA.
=:
=: 73, Van - W8UOF
=: wvanhorn@magnus.acs.ohio-state.edu

(Note that you can get effective large conductor diameters by building a
"cage" of small wires, or just spreading several of them parallel in
one plane. You can also "fan" them. Though this probably isn't
exactly a fair comparison, consider that a discone antenna is _quite_
broadband. The "cage" or "fan" is likely the most practical way to
lower the effective "Q" of a resonant antenna structure at low
frequencies, but see also very recent QST and I believe also CQ articles
(within the past month, I believe) for networks that you can parallel an
antenna with to make the SWR on the feedline low over a wider bandwidth,
for the same antenna structure; just because the antenna structure is
operated off-resonance does not mean it is a poor radiator -- it may just
be difficult to get power to it.)

Date: Thu, 2 Sep 1993 17:37:51 GMT
From: swrinde!gatech!destroyer!vela.acs.oakland.edu!rcsuna.gmr.com!kocrsv01!
c2xjcb@network.ucsd.edu
Subject: Antennas, Q and bandwidth
To: ham-ant@ucsd.edu

In article <1993Sep2.032920.15140@ultb.isc.rit.edu>, jdc3538@ultb.isc.rit.edu
(J.D. Cronin) writes:
>
>
> Do antennas have a "Q" factor associated with them, like a capacitor,
> inductor or a tuned circuit? Does this affect the range of frequencies
> a resonant antenna can be used on? Is it possible to extend the
> useable frequency range of an antenna by lowering the Q factor
> (that is, having more resistance in it)?
>
> And where does increasing frequency range by increasing element
> diameter fit in to all this?
>
> Thanks...Jim
> N2VNO
>

Yes, antennas have a "Q"; it is this "Q" that determines how "peaked"

the SWR curve is thru a band.

In general, the greater the diam/length ratio (i.e. the "fatter" the radiating element) the lower the Q, and thus the wider the bandwidth (generally measured at the 2:1 SWR points). Wire antennas have a higher "Q" than a pipe antenna, and thus generally have higher band-edge SWRs. Thus, increasing the diameter of the element will have the appearance of increasing the frequency range (range over which a "good match" can be made).

An antenna which is shortened by use of a "loading coil" has an even higher "Q", and thus an even "peakier" SWR curve.

One thing I've often considered doing, except that I only work HF-bands and this idea is more practical for VHFers, would be to make a 1/4-wave (or 5/8-wave) vertical using large Hi-C (or other juice cans, the ones which are about 6" in diameter) soldered end-to-end. Talk about a large diam/length ratio! Should have very LOW "Q". Somehow the thought of soldering 33ft worth of juice cans (much less drinking them all) for a 20M antenna never got me excited. :-)
--
James C. Bach Ph: (317)-451-0455
Advanced Project Engr. GM-NET: 8-322-0455
Powertrain Strategy Grp Amateur Radio: WY9F
Delco Electronics Corp. Just say NO to UNIX!

Date: 3 Sep 1993 17:52:47 GMT
From: usc!howland.reston.ans.net!noc.near.net!jericho.mc.com!fugu!levine@network.ucsd.edu
Subject: G5RV
To: ham-ant@ucsd.edu

I have a 50' tower with a mast and a yagi at about 56'.

For 40 & 80 I will use a G5RV for now.

I am going to mount the G5RV as a slightly inverted V with the center insulator tied off to the top plate. The 31' (I think) of ladder line must run down the tower to the transformer and then the coax will continue into the shack.

I know there will be some coupling of RF to the tower. What is best:

1) Coming down at an constant angle away from the tower to the ground

   or

2) Coming off the tower about 3' from a standoff then
   straight down to another standoff (where the tranformer is)
   Then coax down to the shack.

Any experiences? I know 3' probably still keeps the tower in the
range of coupling, but that is about the limit I can reach while
"belted" to the tower.

Other suggestions maybe?

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         || \\ || // || \\ //   \\ //
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--FTAC
Bob Levine KD1GG 7J1AIS VK2GYN
levine@mc.com   (508) 256-1300 x247
kd1gg@wa1phy.ma   FAX (508) 256-3599

Date: 3 Sep 1993 22:59:23 -0400
From: swrinde!gatech!howland.reston.ans.net!noc.near.net!news.delphi.com!
news.delphi.com!not-for-mail@network.ucsd.edu
Subject: G5RV
To: ham-ant@ucsd.edu

>I know there will be some coupling of RF to the tower. What is
>best:

>2) Coming off the tower about 3' from a standoff then
>   straight down to another standoff (where the tranformer is)
>   Then coax down to the shack.

>Bob Levine KD1GG 7J1AIS VK2GYN

Bob, the nature of a transmission line confines the size of the field.
Currents flow in opposite directions in each conductor tending to
cancel the fields. 3' is plenty. If I were you, I would be more worried
about the 3-5 db loss in the RG-59 coax per 100' with an SWR=20 as you
will experience with a G5RV on some of the bands. Take a look at the loss

charts at the end of the Transmission Line chapter in the ARRL Handbook
along with the antenna impedences from an antenna analysis program like
ELNEC and you will throw away your coax forever with a G5RV.

Anybody who wants to know what ELNEC and transmission line theory says
about the G5RV, send me your e-mail address.

73, KG7BK, CECILMOORE@DELPHI.COM

Date: Thu, 2 Sep 1993 17:30:51 GMT
From: swrinde!gatech!destroyer!vela.acs.oakland.edu!rcsuna.gmr.com!kocrsv01!
c2xjcb@network.ucsd.edu
Subject: J-pole polarity
To: ham-ant@ucsd.edu

In article <CCp6I4.MI@murdoch.acc.Virginia.EDU>, porter@hopper.ACS.Virginia.EDU
(Alan Porter) writes:
>
> I built a "copper cactus" J-pole using copper water pipe. It works
> on 2 meters. The larger section is a 3/4 wave and the smaller section
> is a 1/4 wave. I noticed after I was finished that I had the polarity
> reversed from my directions. My directions say that the center conductor
> should be hooked to the shorter segment, and the braid should connect
> to the longer segment. I did the opposite (of course, I used hose
> clamps so I could easily switch or adjust them).
>

It shouldn't matter. If you analyze what a "J-pole" really is, you'll
see that it is a 1/2-wave radiating section fed by a parallel
conductor transmission line (the portion of the 3/4 wave pipe and the
1/4 wave pipe that is "above" the feedpoint) and is shorted-stub
impedance matched (the portion of piped "below" the feedpoint).
Moving the feed-point up/down the pipes adjusts the apparant length of
both the "stub" and the "feedline"; at the "full bottom" position your
coax sees a "short" because not only are the two pipes connected
together (Z=0) but the hi-Z of the 1/2-wave gets transformed to low-Z
by the 1/4wave transmission line. At the "full top" position your
coax sees a "open" because the 1/2-wave radiator is a hi-Z and because
the shorted pipes 1/4-wave away look like an "open". Somewhere in
between you'll find 50 Ohms.

Since the portion of the "mast" which is below the "tie point" of the
two pipes is not doing anything (it's past the short in the matching
stub) it's connection to ground (or lack thereof) does nothing to the
coax/antenna. Therefore, it doesn't matter which pipe the "ground" of
the coax is connected to; except that your signal is transmitted 180

degree out of phase.
--
James C. Bach Ph: (317)-451-0455 The views & opinions expressed
Advanced Project Engr. GM-NET: 8-322-0455 herein are mine alone, and are
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Delco Electronics Corp. Just say NO to UNIX! encouraged by DE or GM.

Date: Fri, 3 Sep 1993 20:51:51 GMT
From: usc!sdd.hp.com!hpscit.sc.hp.com!icon.rose.hp.com!greg@network.ucsd.edu
Subject: J-pole polarity
To: ham-ant@ucsd.edu

James Bach (c2xjcb@kocrsv01.delcoelect.com) wrote:
:
:
: Since the portion of the "mast" which is below the "tie point" of the
: two pipes is not doing anything (it's past the short in the matching
: stub) it's connection to ground (or lack thereof) does nothing to the

That's the theory, but my results were different. I've built a copper pipe J-pole recently, and it all worked very well until I added about 12" to the 34" piece that attaches *below* the short. The position of the feed line became extremely critical and unreproducable. Since the 12" section was only to make the antenna mount easier, I removed it and modified the thing it mounted to. All's well now.

My theory is that since I'm feeding the antenna with coax, the shield side of the coax needs to be at RF ground at the feed point in order for the shield not to radiate and otherwise interfere with the antenna. Well, since the parallel section of the antenna is balanced, RF ground is down at the short at the bottom of the J, and the shield is flapping all over the place, RF-wise.

The way this all works (sez the theory), is that the piece of pipe below the short in the J acts as a counterpoise of sorts, and needs to be a certain length (resonance) to move the RF ground back to where the shield attaches. Hold the J-pole sideways (including the stuff below the J), and it looks like a dipole with a funny delta match stuck in the middle. It even balances on your finger at about the feed point.

Construct the theory to fit the results, right? Works for me.

Greg KD6KGW

Date: Fri, 3 Sep 1993 14:44:06 GMT

From: spsgate!mogate!newsgate!nuntius@uunet.uu.net
Subject: Multiband Hustler on Ford Aerostar?
To: ham-ant@ucsd.edu

In article <CCrx1y.2J3@news.udel.edu> Robert Penneys,
penneys@brahms.udel.edu writes:
>I am now driving a Ford Aerostar minivan, an excellent ham vehicle,
by the way.
>
>I want to mount my Hustler with the foldover mast and four resonators
up top.

You could try mounting it to a plate (aluminum, steel) which is bolted
to the
luggage carrier. I did this for field day and it worked pretty well.
The
Aerostar luggage rack has moveable, threaded blocks in the tracks.
This makes
it easy to install and remove. Of course, you will have a problem
with garages,
bridges, trees, etc...

* Chris Terwilliger, AA7WD   a229aa@email.sps.mot.com *
* Motorola   "And now, the sequence of events, *
* 2100 E. Elliot Rd. EL508   in no particular order."   *
* Tempe, AZ 85284   - Dan Rather *

Date: 2 Sep 93 16:19:21 GMT
From: att-out!cbfsb!cbnews!cbnewst!cbnewsm!jeffj@RUTGERS.EDU
Subject: Questions on antenna resonance...
To: ham-ant@ucsd.edu

Here is a question that I have. After modeling my G5RV on Mininec3
for 40 meters it showed that the antenna impedance was 20 + 800J ohms.
So my 17 feet of 450 ohm ladder line will transform the 20 ohms to about a
22:1 SWR. However the antenna loads up great on 40 meters and works really
well. I guess the question I have is, as long as there is a good chunk
of reactance that you can use a antenna tuner to tune out can you can make a
antenna resonant on any band no matter what the actual resistance of
the antenna (20 ohms in this case)? On 10 meters the impedance is
100 + 80J ohms, for obivous reasons it doesn't load up all that well.
Thanks for any help here! 73!

Jeff
--

Jeff Jones AB6MB | OPPOSE THE NORTH AMERICAN FREE TRADE AGREEMENT!
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Date: Thu, 02 Sep 1993 16:48
From: dog.ee.lbl.gov!agate!library.ucla.edu!news.mic.ucla.edu!MVS.OAC.UCLA.EDU!
CSMSCST@network.ucsd.edu
Subject: Questions on antenna resonance...
To: ham-ant@ucsd.edu

In article <CCqIoH.HqJ@cbnewsm.cb.att.com>,
jeffj@cbnewsm.cb.att.com (jeffrey.n.jones) writes:

>well. I guess the question I have is, as long as there is a good chunk
>of reactance that you can use a antenna tuner to tune out can you can make a
>antenna resonant on any band no matter what the actual resistance of
>the antenna (20 ohms in this case)? On 10 meters the impedance is

No no no no *NO*!

Nothing you do at the far end of the transmission line (ie, the
end in the shack) has the slightest effect of the 'resonance' of
the antenna connected to the other end. What your tuner does is
transform the reactance presented by the end of the transmission
line to a value into which your transmitter is able to deliver
power. That transformation occurs within the tuner. From the
point at which the transmission line leaves the tuner out to and
including the antenna, nothing changes.

If your questions is, can I use a random length dipole fed with
open wire line and matched to my transmitter with a tuner over a
wide range of frequencies, the answer is *yes*. The antenna
will become increasingly inefficient when it becomes short with
respect to wavelenght (eg, overall length < 1/10 wavelength),
and it will exhibit an increasing number of dips and peaks in
its radiation pattern as the frequency is increased (eg, length
> 2 or 3 wavelengths) but it will radiate all the RF dumped into
it just fine.

  -- 73 de Chris Thomas, AA6SQ (ex-WA6HTJ) (CSMSCST@MVS.OAC.UCLA.EDU)

End of Ham-Ant Digest V93 #36
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